Unranked Tree Rewriting and Effective Closures of Languages

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We consider rewriting systems for unranked ordered trees, where the number of children of a node is not determined by its label, and is not a priori bounded. The rewriting systems are defined such that variables in the rewrite rules can be substituted by hedges (sequences of trees) instead of just trees. Consequently, this notion of rewriting subsumes both standard term rewriting and word rewriting.

We present some properties of preservation for classes of unranked tree languages, including hedge automata languages and various context-free extensions. Finally, applications to static type checking for XML transformations and to the verification of read/write access control policies for XML updates are mentioned.